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(54) Title: SEPARATION OF METALS

(57) **Abstract:** The invention provides a process for the separation of metals, the metals being comprised as the metal oxides in a mixed oxide sample, the process comprising: (i) adding the mixed oxide to a molten salt electrolyte and cathodically electrolysing the oxide, the potential of the cathode being controlled so as to favour oxygen ionisation over deposition of metal from the cations present in the molten salt, and the applied potential difference being such as to facilitate selective reduction of one metal oxide at the expense of other metal oxides; and (ii) separating the metal from the remaining metal oxides, wherein the metal oxides comprise oxides of metals from at least one of the transition metal, lanthanide or actinide series. The process is applicable to mixed oxide samples comprising mixtures of two or more metal oxides, and a particular application is in the separation of zirconium and hafnium comprised in mixed zirconium and hafnium oxides, the removal of hafnium facilitating the use of the zirconium in fuel cladding for use in the nuclear power industry.